



COVE - SITE CHARACTERIZATION / FIRST YEAR RESULTS



CERES OCEAN VALIDATION EXPERIMENT

COVE

SITE CHARACTERIZATION USING FIRST YEAR RESULTS

**Ken Rutledge
Analytical Services & Materials, Inc.
Atmospheric Sciences Group
NASA Langley Research Center
Hampton, Virginia, 23666**

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southern
exposure



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PRESENTATION OUTLINE

- COVE team
- purpose of COVE
- location, plume influence, large scale dynamics of the area
- measurements/networks involved, history of measurements
- temp, winds, waves (longterm averages)
- cloud + aerosol forcing / clear skies
- aerosol trends using AERONET
- airmass trajectory summary
- particle size distributions - marine / continental
- wave dependence of albedos
- wave dependence of surface radiances
- site characterization summary



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COVE TEAM

Tom Charlock, Yongxiang Hu, Greg Schuster
LaRC, Radiation and Aerosols Branch

Seiji Kato, Wenying Su
Hampton University, Center for Atmospheric Sciences

Martial Haeffelin, Bernardo Domingues
Virginia Polytechnic Institute, Dept. of Mechanical Engineering

Fred Denn, Bryan Fabbri, Kevin Larman, Jay Madigan
Joanne Saunders, Fred Rose, Dave Rutan, Ken Rutledge
Analytical Services & Materials, Inc., Atmospheric Sciences Group



Purpose of COVE

COVE fills a void in atmospheric radiation research by providing:

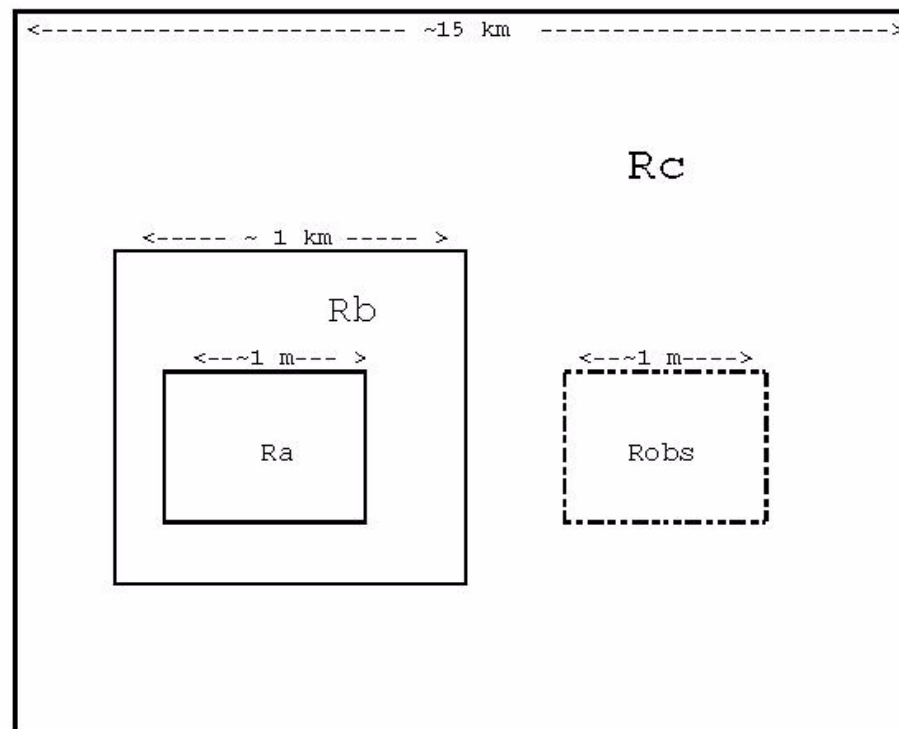
- site for short / long term atmosphere and ocean radiation measurements
- testbed to address atmospheric/ocean interface radiation transfer problems
- perhaps.... a simpler laboratory to test CERES modeling concepts

Why this location?

- homogeneity of the scene type
- long term radiometry stations in the marine environment are few
- stable platform a distance from the ocean's surface make it better than bouys
- moderate power and communications options are feasible



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Representation of reflectance R for different FOVs

Robs (~1 m) of observed FOV at surface

Ra (~1 m) of ideal FOV at surface

Rb (~1 km) of MODIS FOV projected to surface

Rc (~15 km) of CERES FOV projected to surface

The FOVs in the above figure are not to scale.

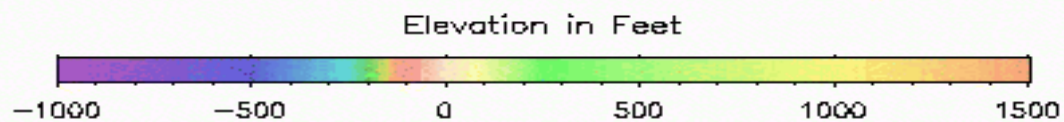
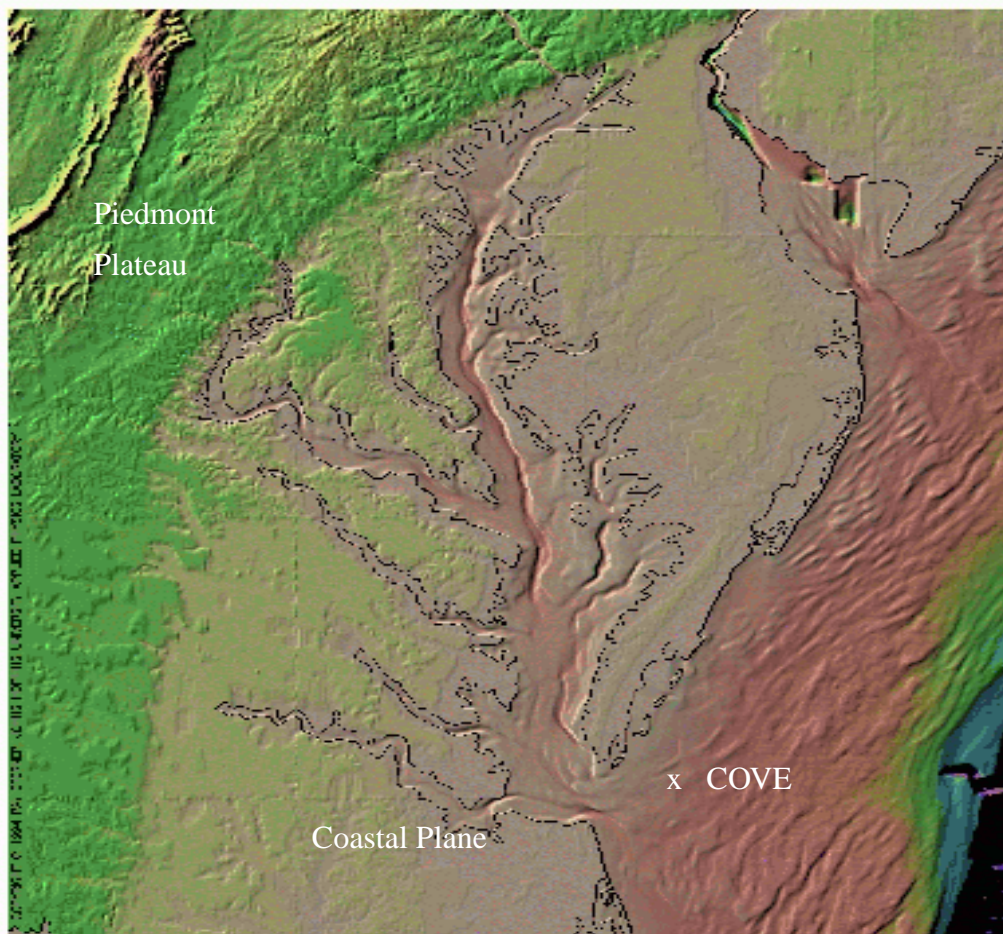
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Chesapeake Bay and Vicinity

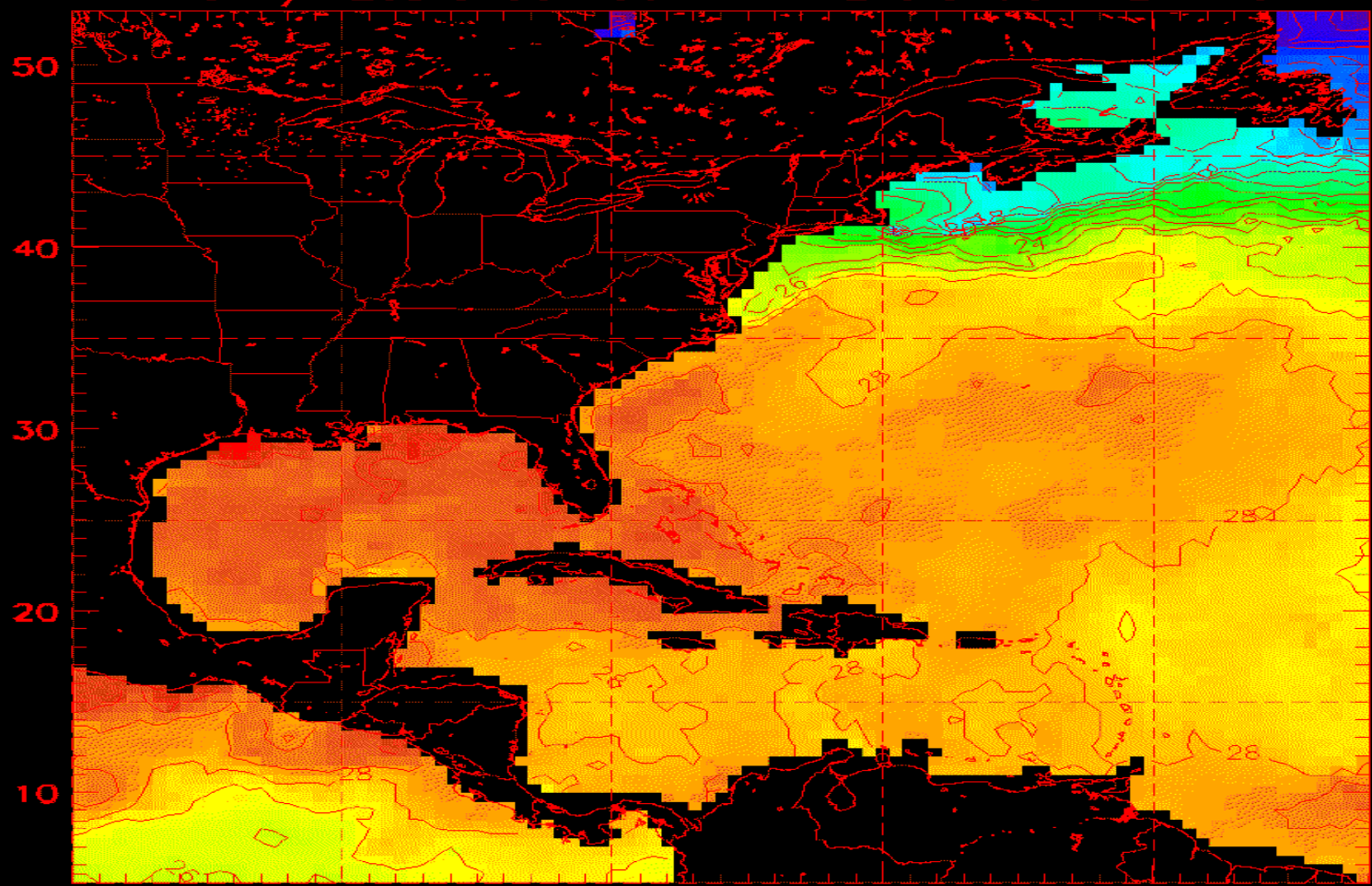


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Ray Sterner
The Johns Hopkins University
Applied Physics Laboratory
Laurel, MD 20723-6099



NOAA/NESDIS SST 50KM ANALYSIS US ATLANTIC



NOAA-14 OPERATION DAY/NITE 8/7/2000 through 8/11/2000

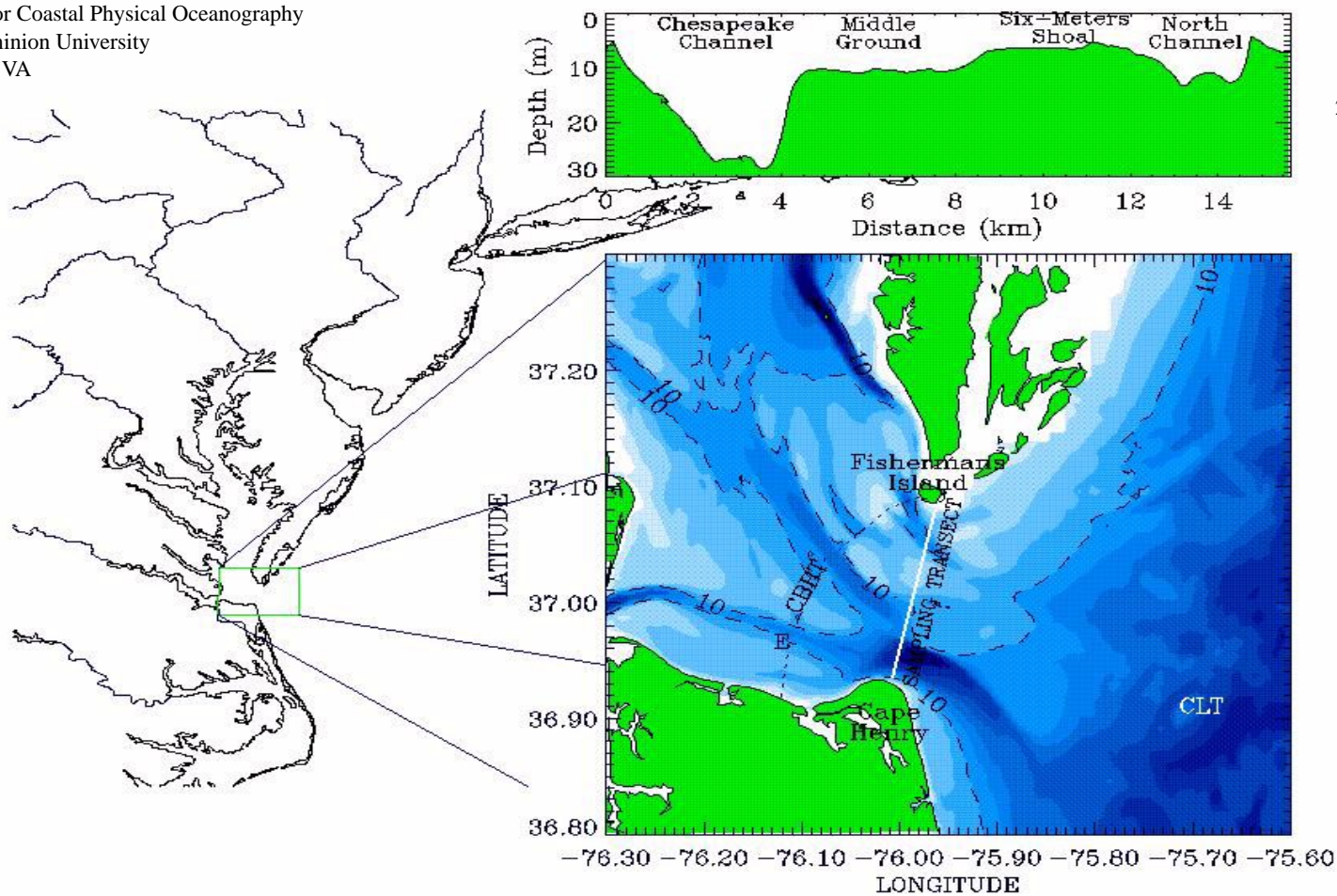
5.20	7.18	8.47	9.75	11.0	12.3	13.6	14.8	16.1	17.4	18.7	20.0	21.3	22.6	23.8	25.1	26.4	27.7	29.0	30.3	31.6
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Arnoldo Valle-Levinson
Center for Coastal Physical Oceanography
Old Dominion University
Norfolk, VA

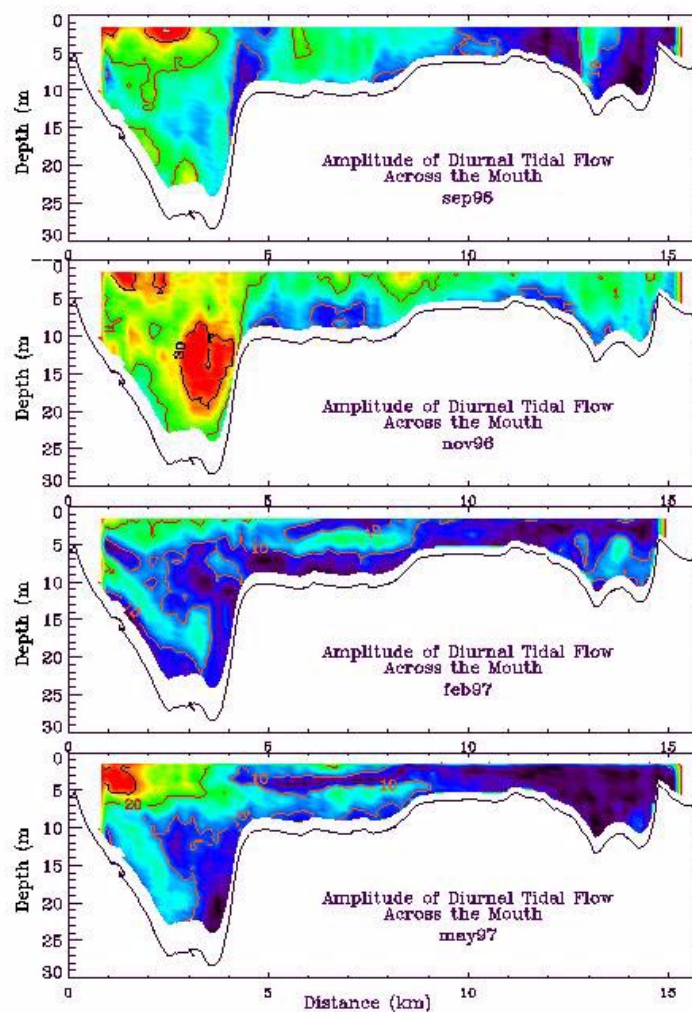


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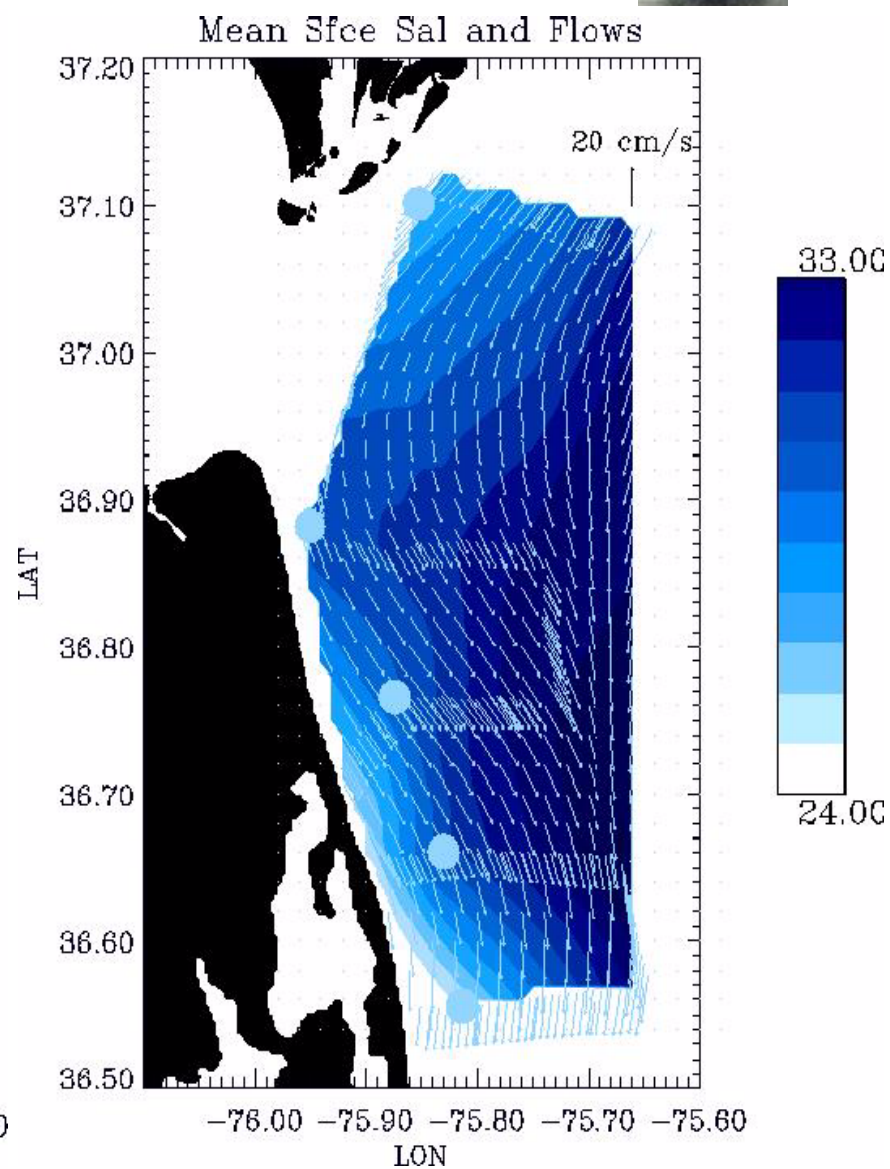
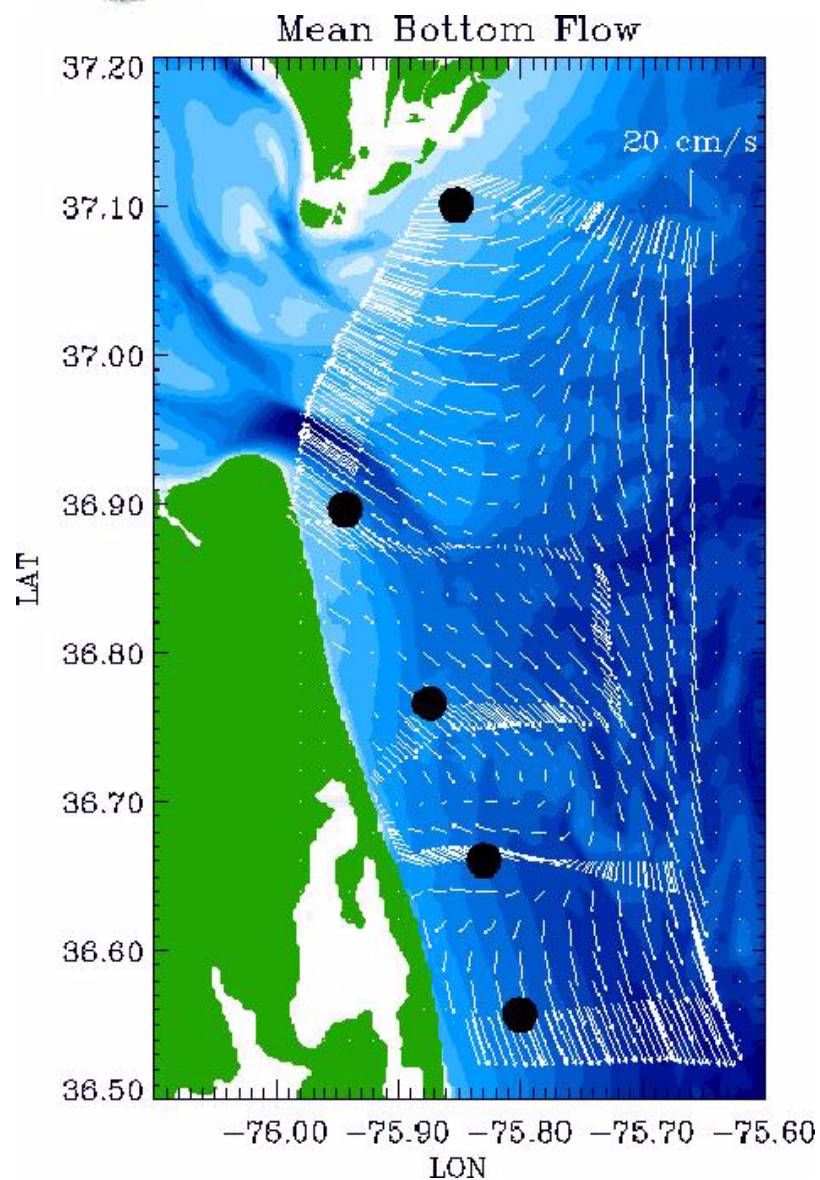
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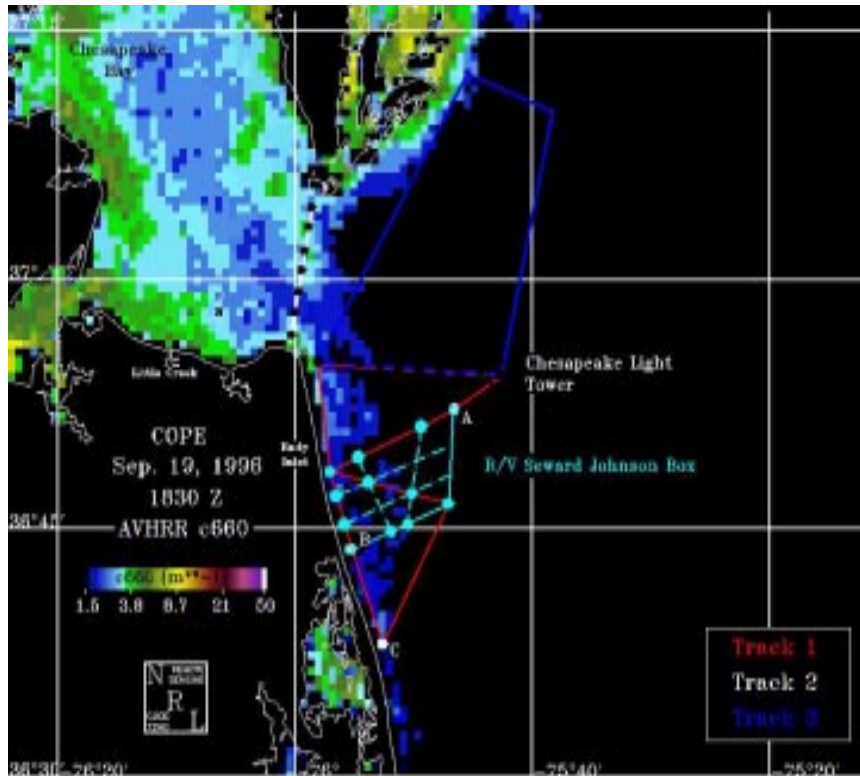
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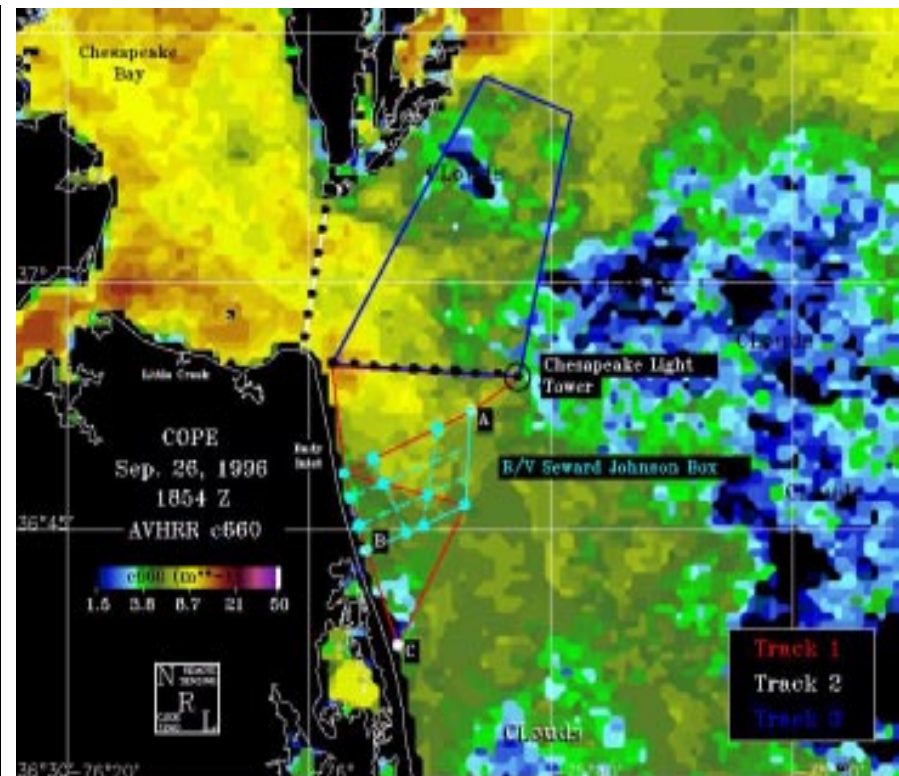
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Flood MSL + 0.364 m



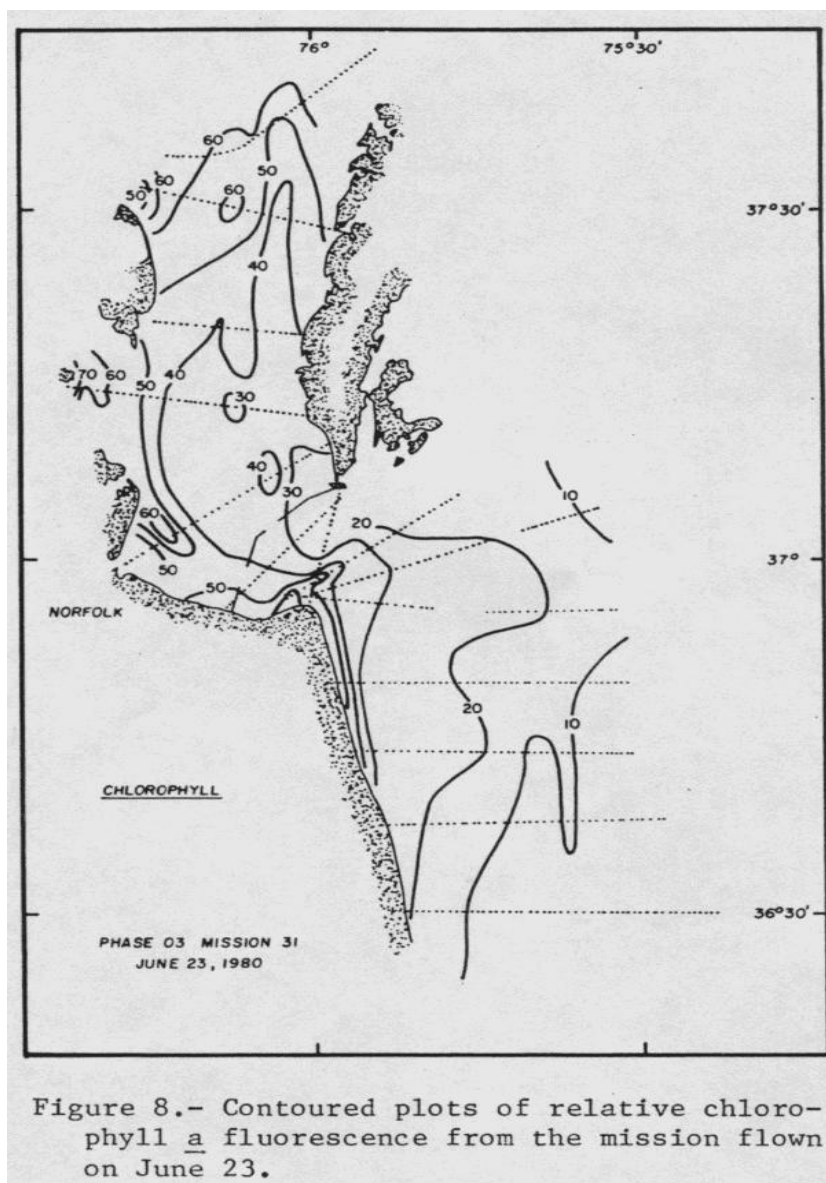
Ebb MSL - 0.333 m

“ Further testing of this C660 algorithm during the Chesapeake Bay 0 Plume Experiment- I [COPE - I] has verified an excellent agreement with both a spectral beam transmissometer and total particle cross-section using a laser particle counter using the algorithm developed from optical properties in the Gulf of Mexico.” - AVHRR Coastal Optics Group / Naval Research Labs - Stennis (<http://orbit35i.nesdis.noaa.gov/orad/sub/c660link.html>)

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F.E. Hoge
NASA Wallops Flight Center
Wallops Island, Virginia

R.N. Swift
EG&G Washing Analytical Services Center, Inc.
Pocomoke City, Maryland

“Application of the NASA airborne oceanographic LIDAR to the mapping of chlorophyll and other organic pigments”

NASA CP 2188, Chesapeake Bay Plume Study, SUPERFLUX 1980, pp 349- 374.



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Continuous Surface Measurements from COVE

CERES/BSRN	EOS/AERONET	NOAA/NDBC	GACP
downwelling global SW flux [KZ CM31]	spectral extinction / sky radiances [CIMEL]	standard met station	ocean surface radiances [Schulz SP1A]
downwelling diffuse SW flux [KZ CM31]		wave energy sensor [Schwartz Electro-Optics]	
downwelling direct SW flux [KZ CH1]			
downwelling LW flux [Eppley PIR]			
upwelling SW flux [Eppley PSP]			
upwelling LW flux [Eppley PIR]			
barometric pressure [Vaisala PTA427]			
wind speed [R.M. Young 05103]			
wind direction [R.M. Young 05103]			
spectral extinction [MFRSR]			



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Duration Of Measurements

long term continuous history, hourly averages

standard met data:	16 years
winds data:	9 years
wave spectral density:	4 years

1 year history, continuous, 1Hz, 1 minute statistics

- downwelling global SW flux
- downwelling diffuse SW flux
- downwelling direct SW flux
- downwelling LW flux
- upwelling SW flux
- upwelling LW flux
- barometric pressure
- wind speed
- wind direction

11 months history, daylight only, 15 minute data

spectral extinction, sky radiances

5 months history, daylight only, 30 minute data

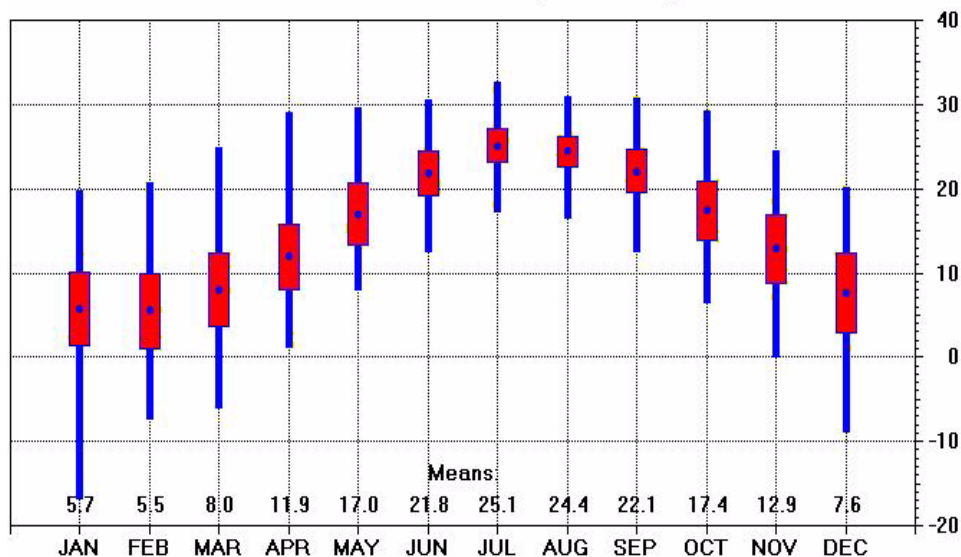
ocean surface radiances



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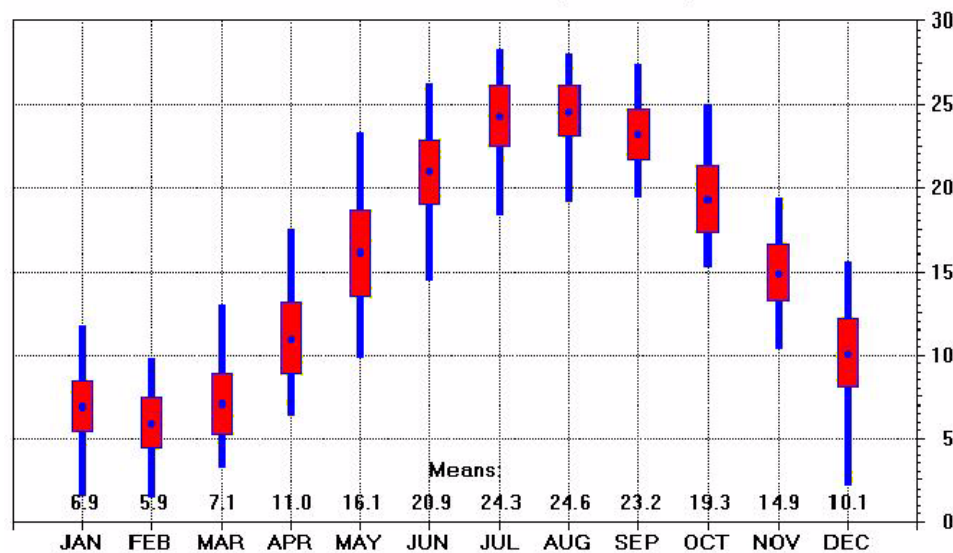
CHLV2 AIR TEMPERATURE (DEG. C) 8/84-12/93



NOAA / NDBC

[http://seaboard.ndbc.noaa.gov/station_history?\\$station=chlv2](http://seaboard.ndbc.noaa.gov/station_history?$station=chlv2)

CHLV2 SEA TEMPERATURE (DEG. C) 8/84- 3/93



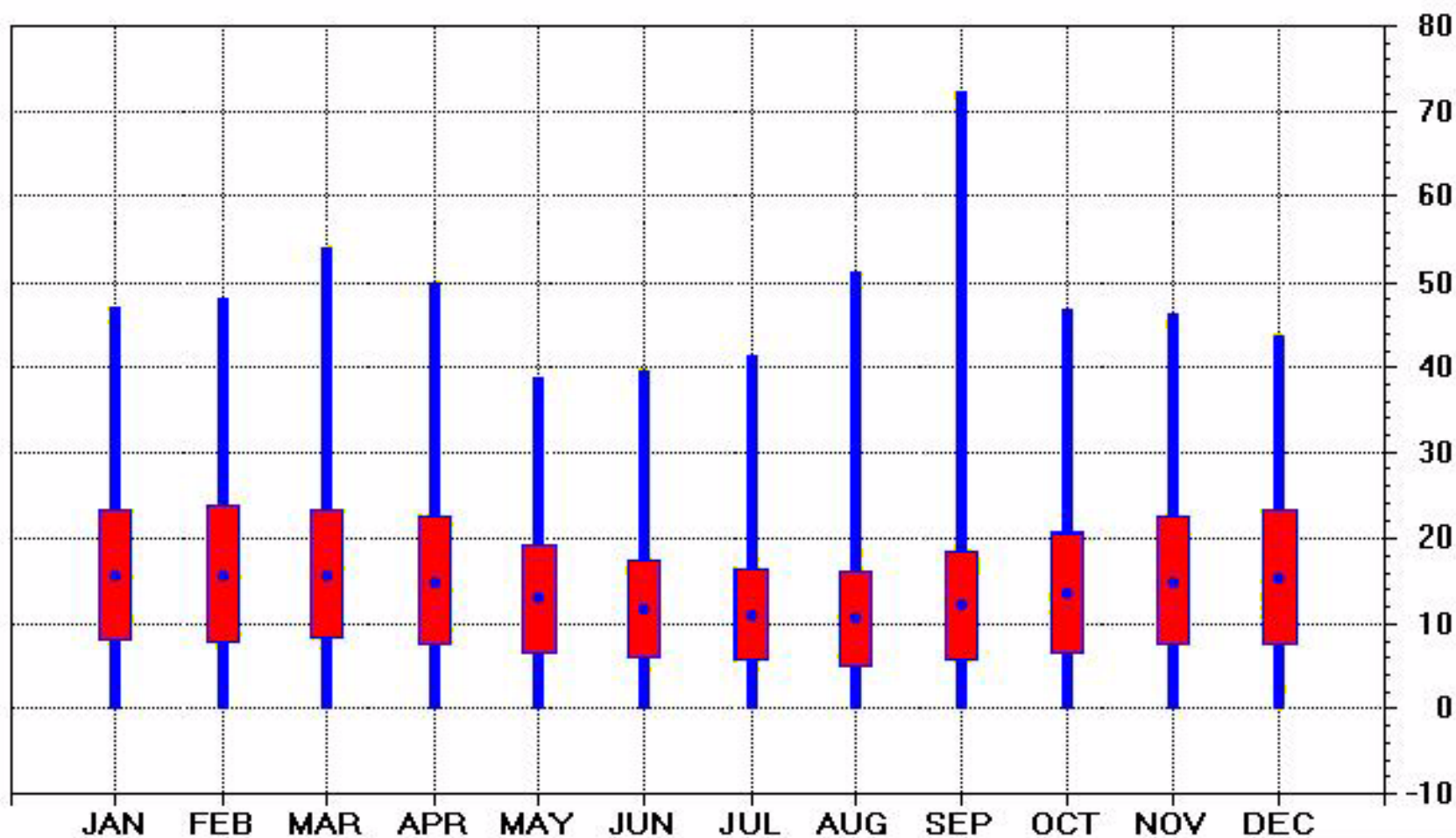
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CHLV2 AVG. WIND SPEED (KNOTS) 8/84-12/93





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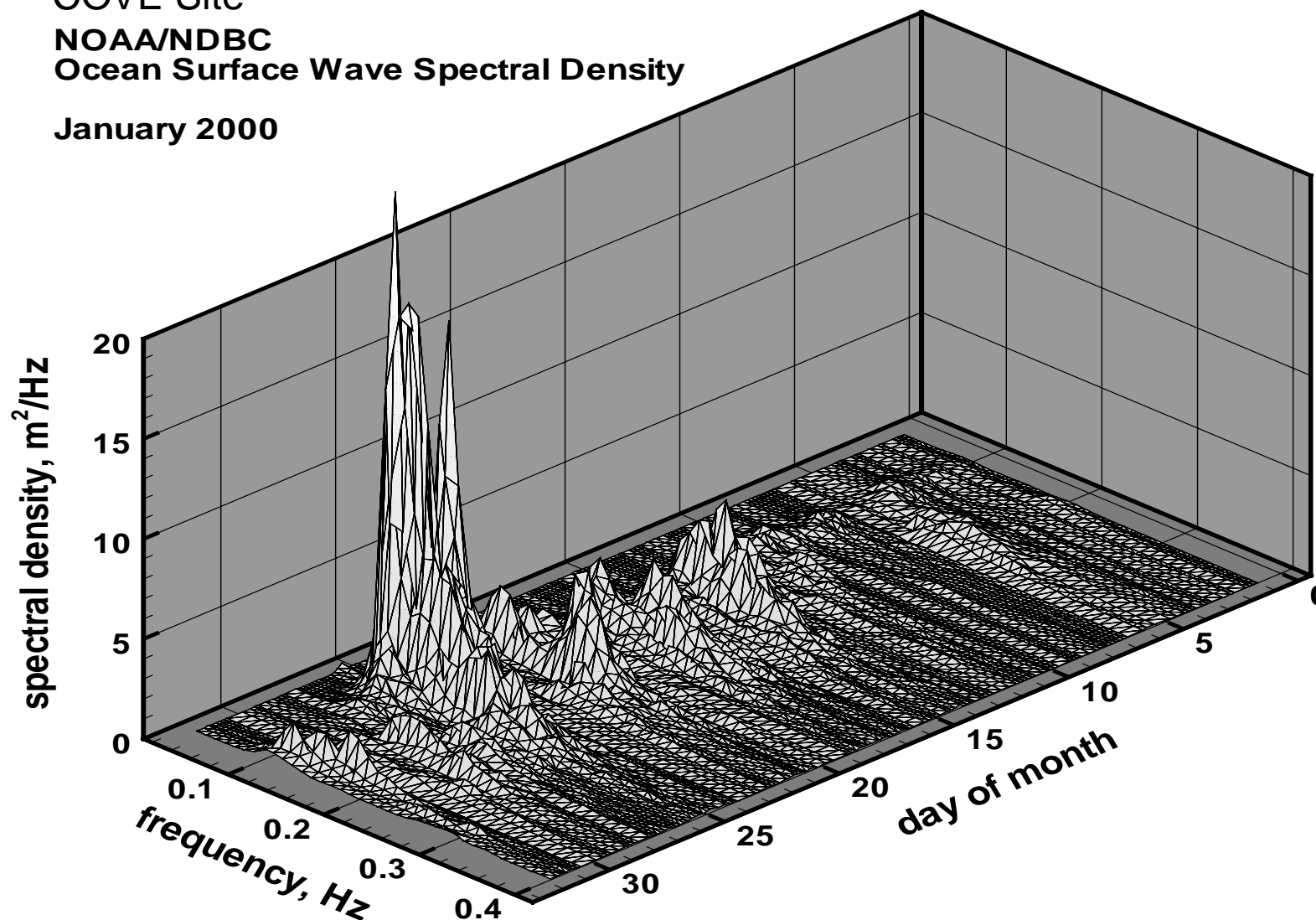


COVE Site

NOAA/NDBC

Ocean Surface Wave Spectral Density

January 2000



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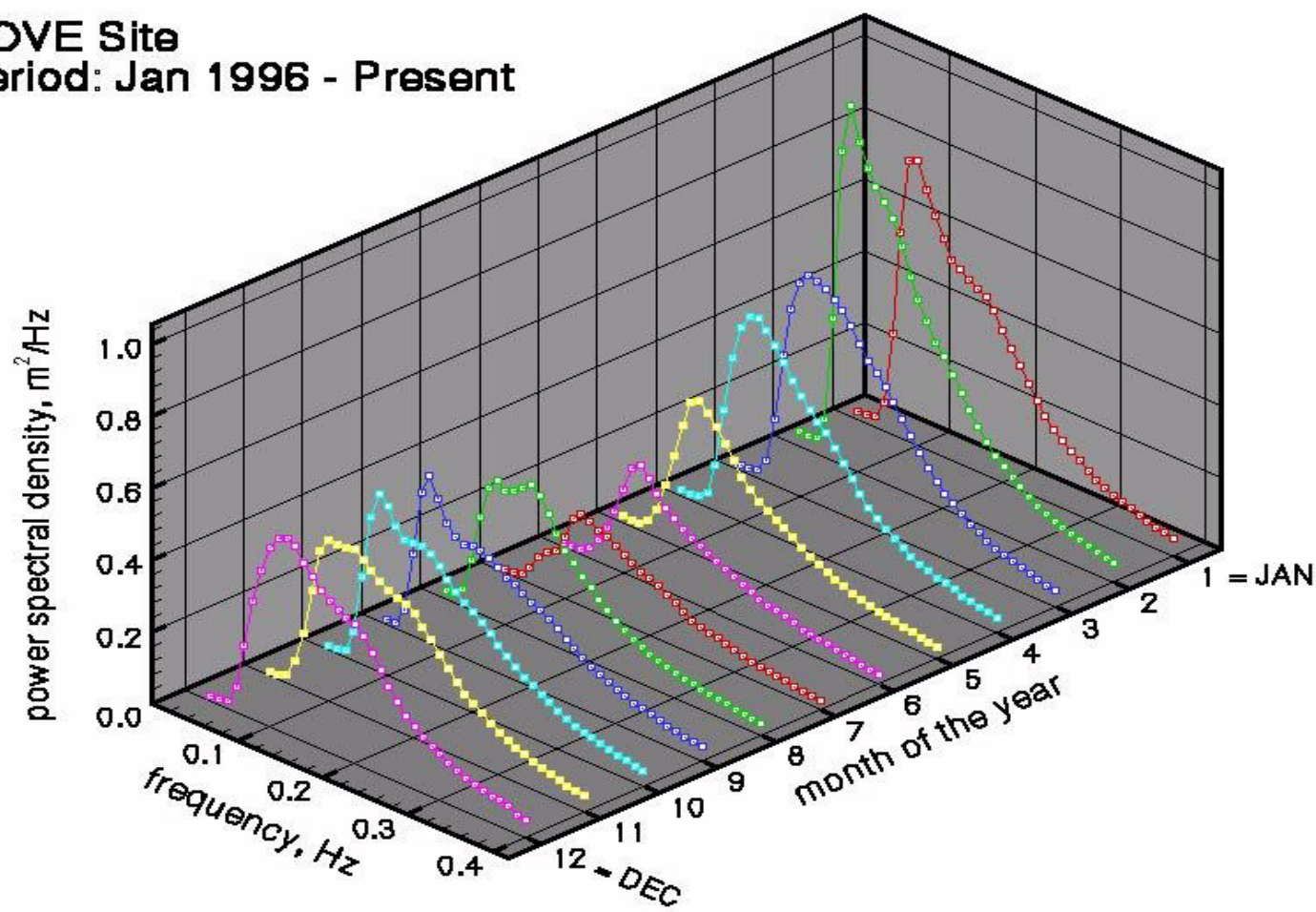


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NOAA/NDBC Monthly Averaged Ocean Wave Power Spectral Densities

COVE Site
Period: Jan 1996 - Present

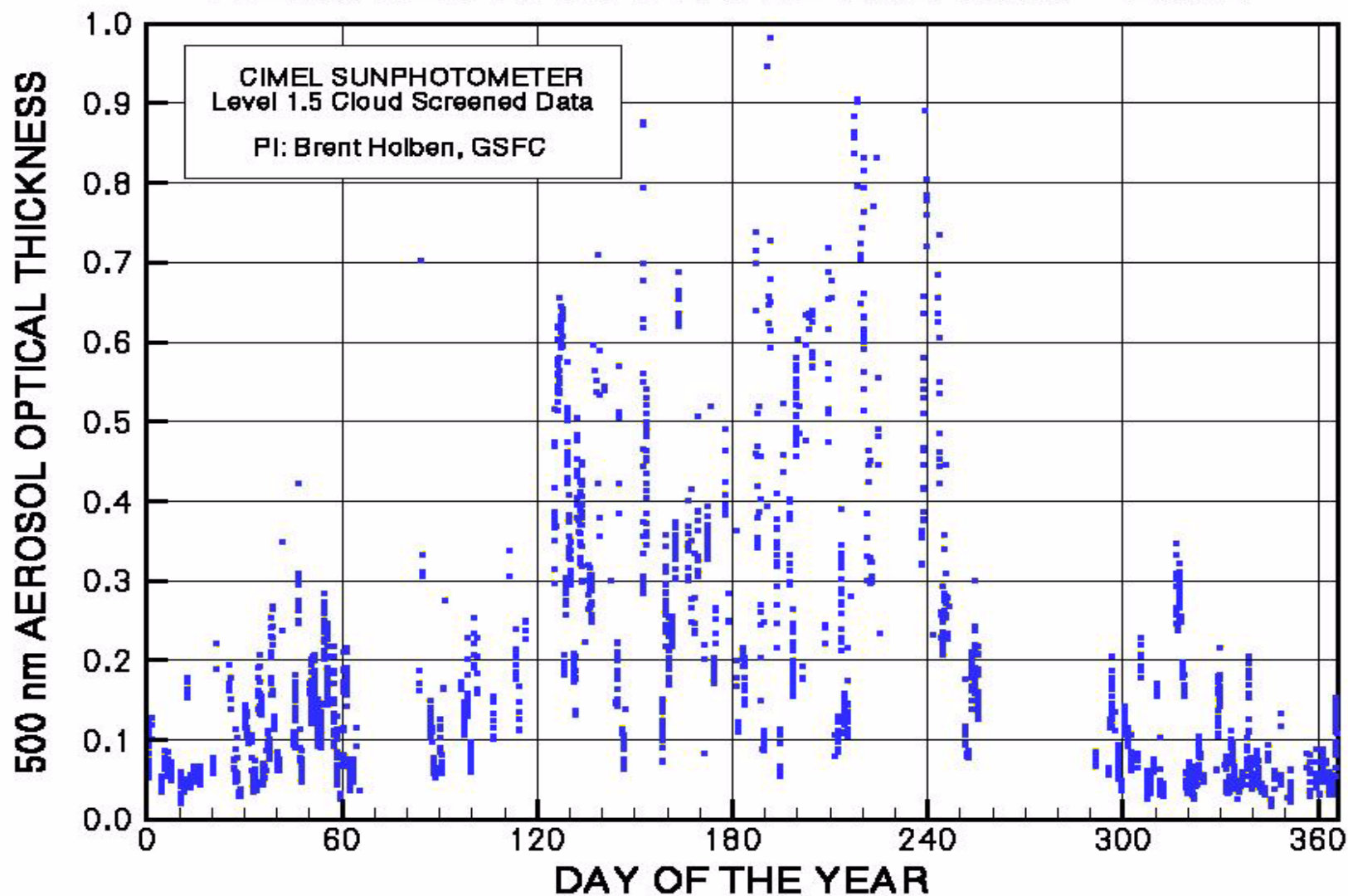




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AERONET DATA: COVE Site 1999 - 2000



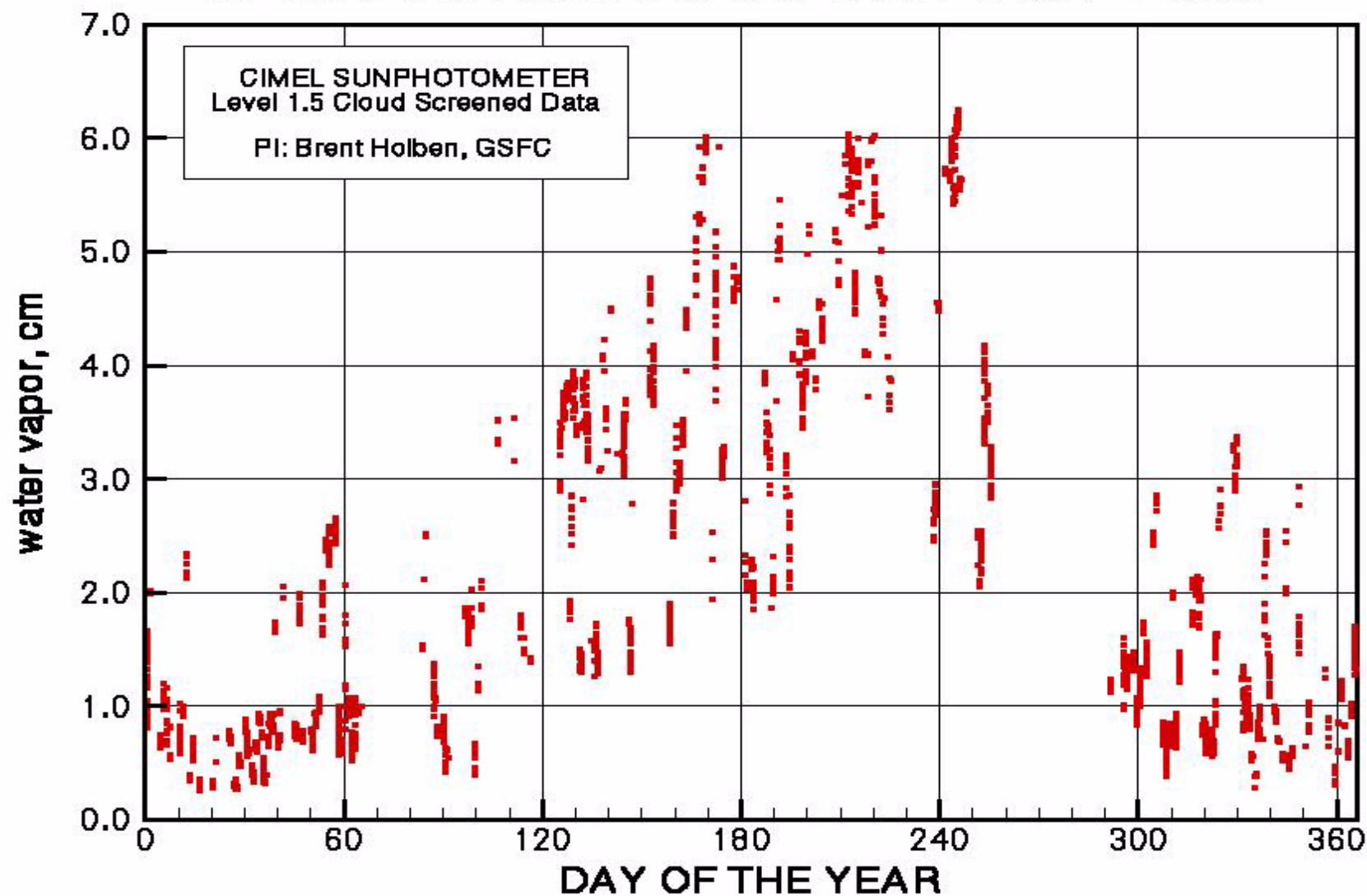
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AERONET DATA: COVE Site 1999 - 2000



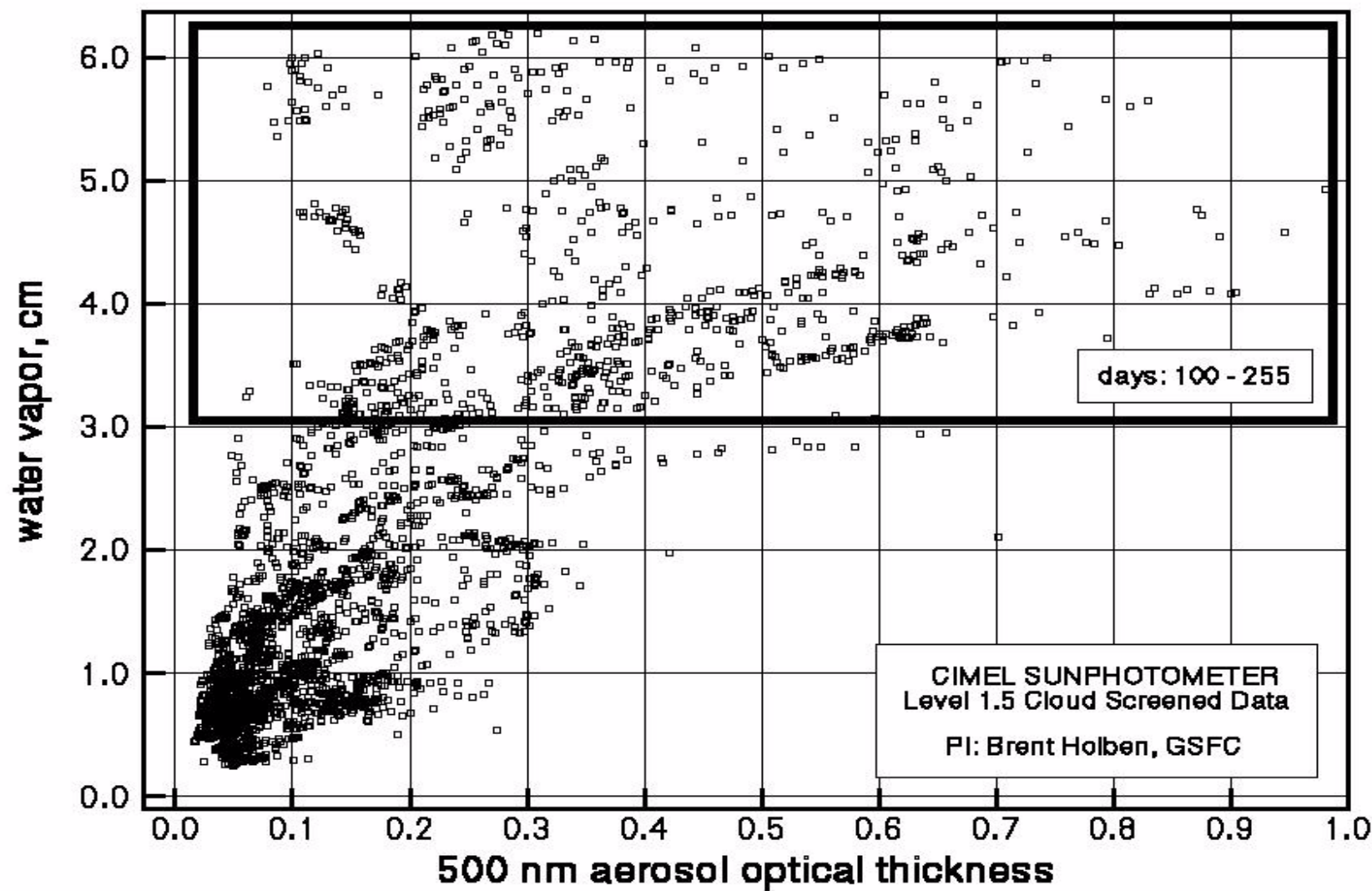
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AERONET DATA: COVE Site 1999 - 2000



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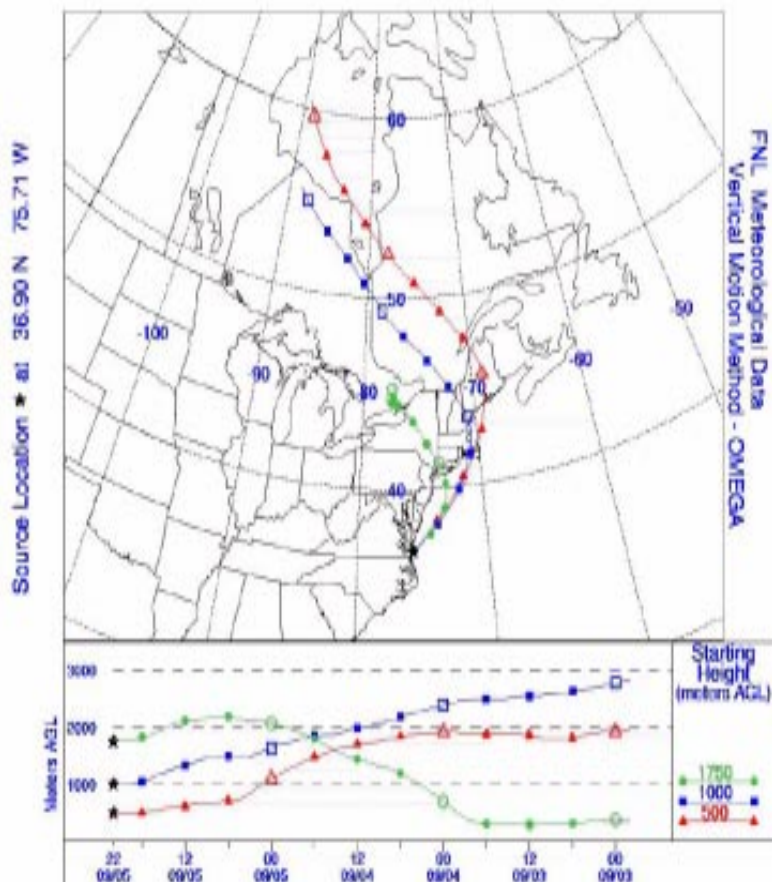
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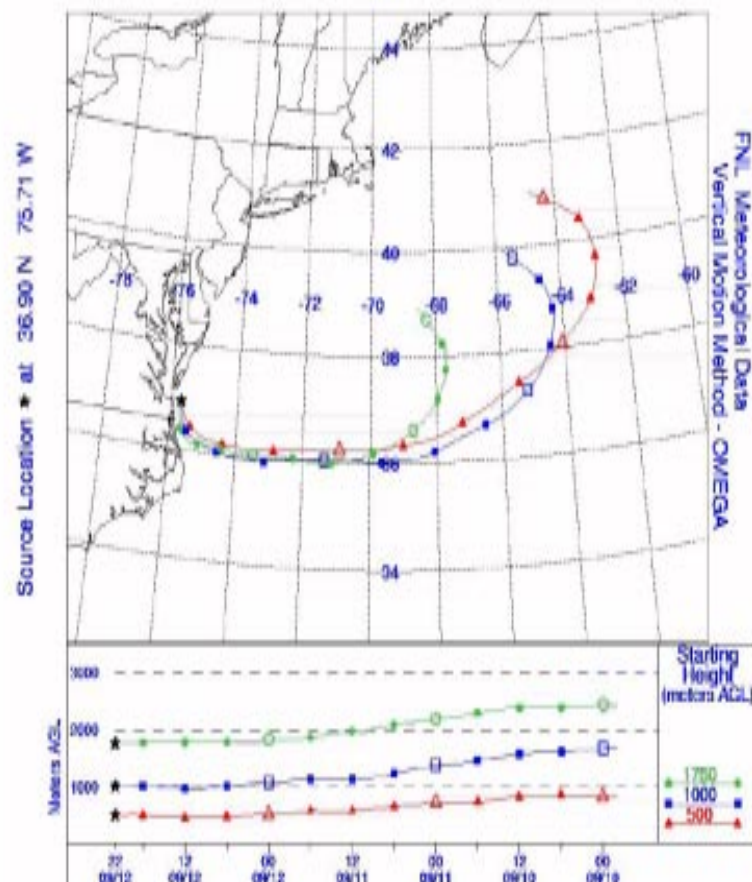
NOAA AIR RESOURCES LABORATORY

Backward Trajectories Ending- 22 UTC 05 SEP 00



NOAA AIR RESOURCES LABORATORY

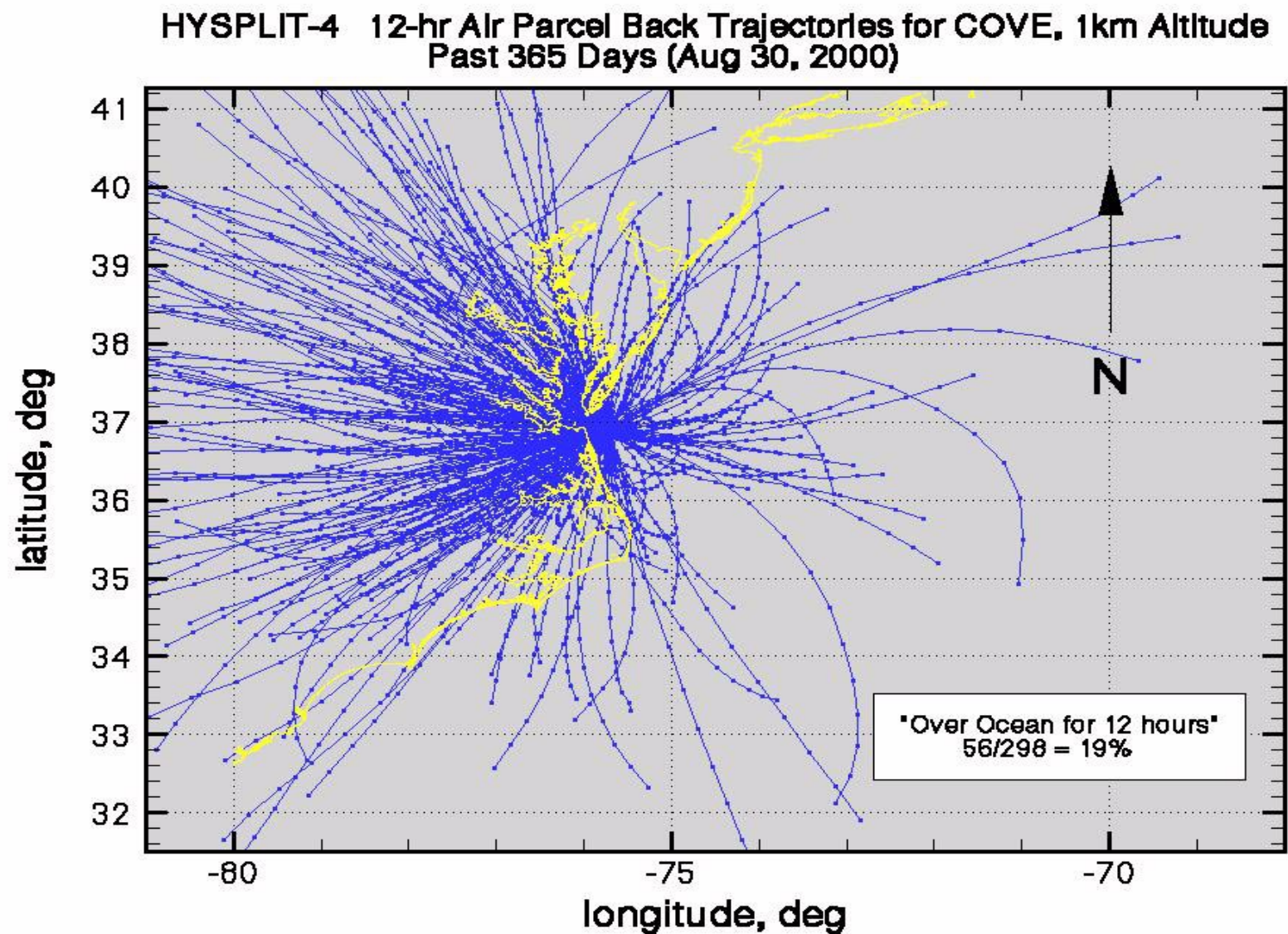
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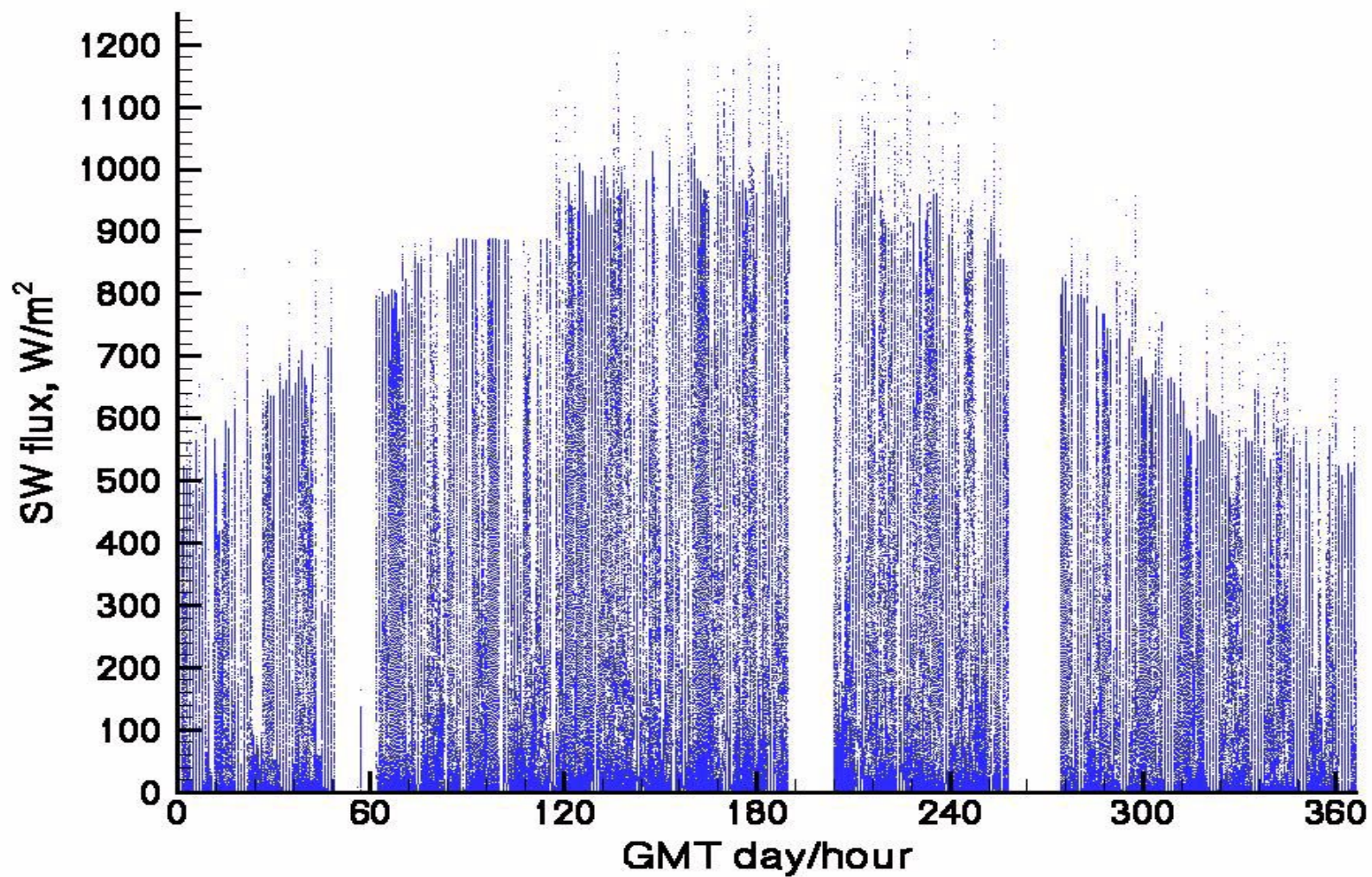
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COVE SW Flux (downwelling global)



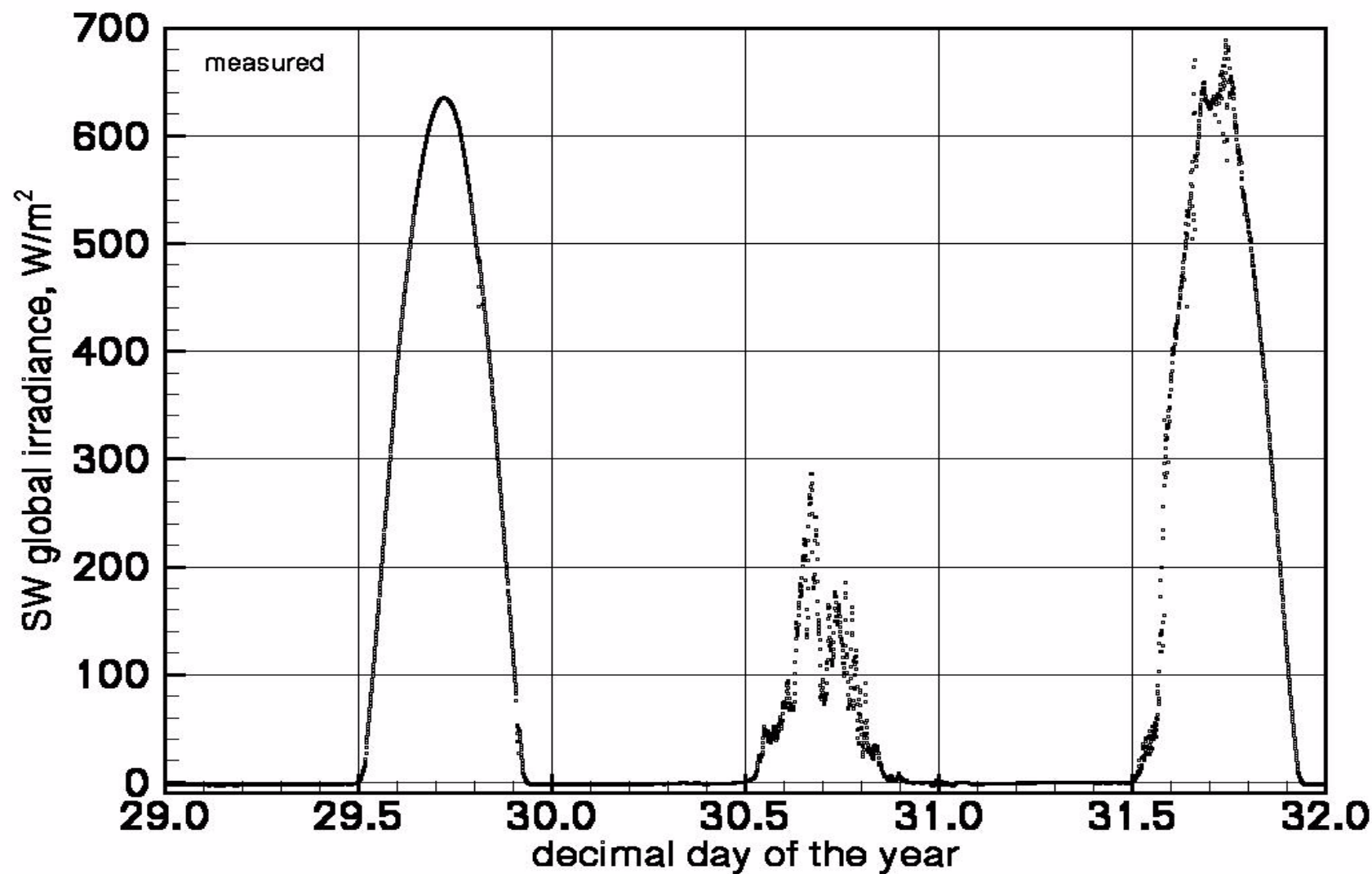
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Measured SW flux for clear, overcast and partly cloudy days



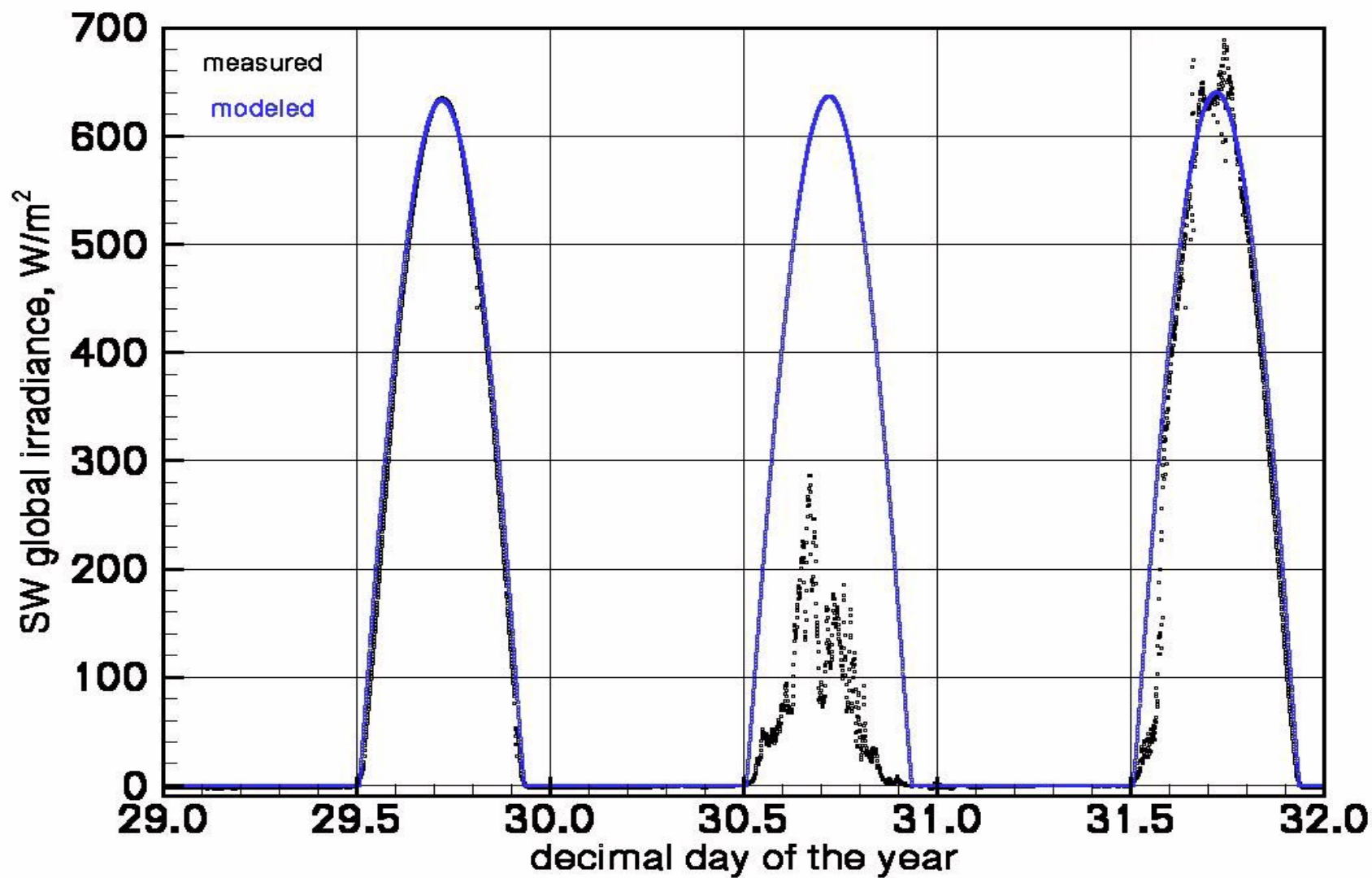
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Measured and modeled SW flux for clear, overcast and partly cloudy days



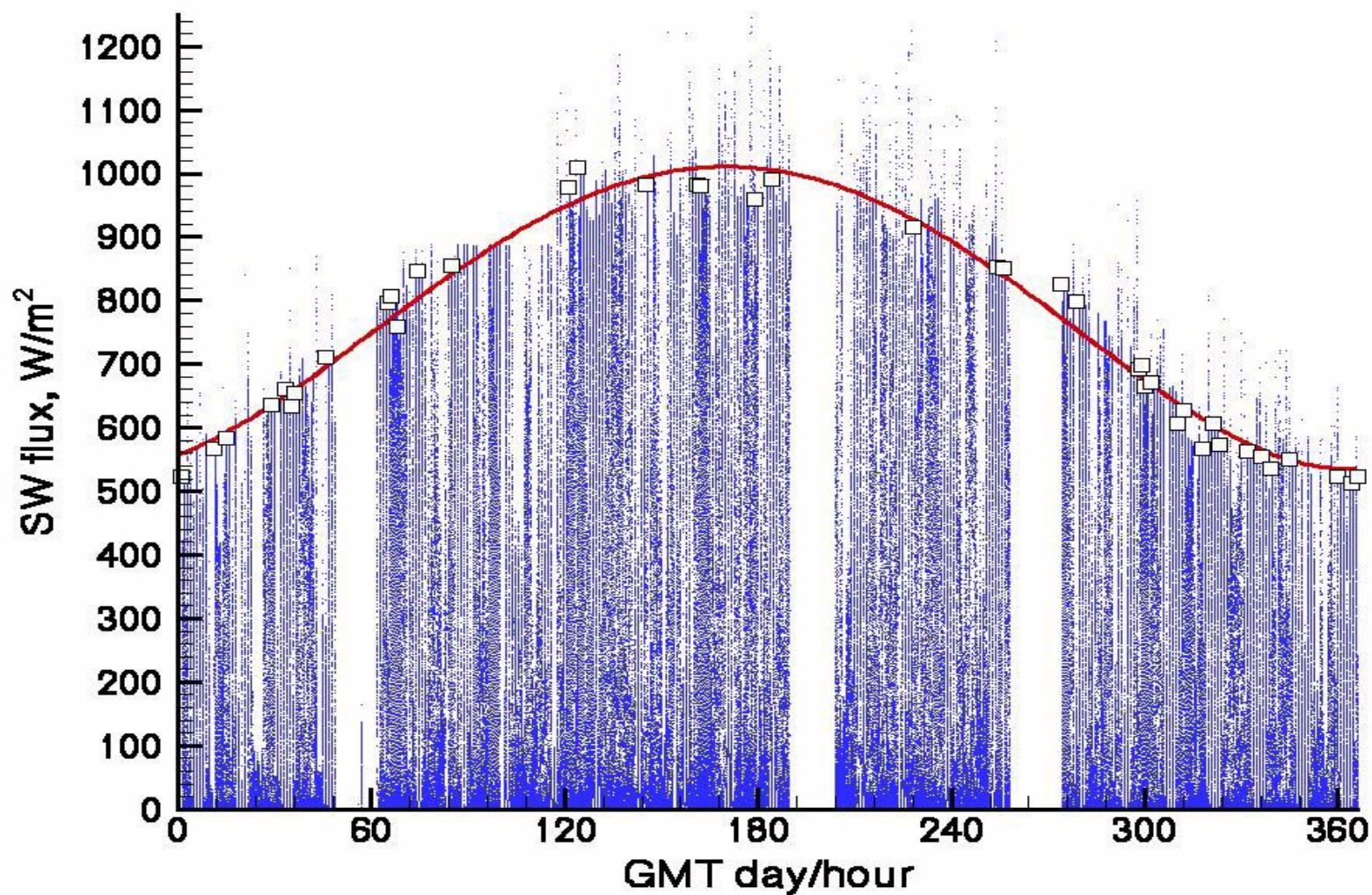
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COVE SW Flux (downwelling global)



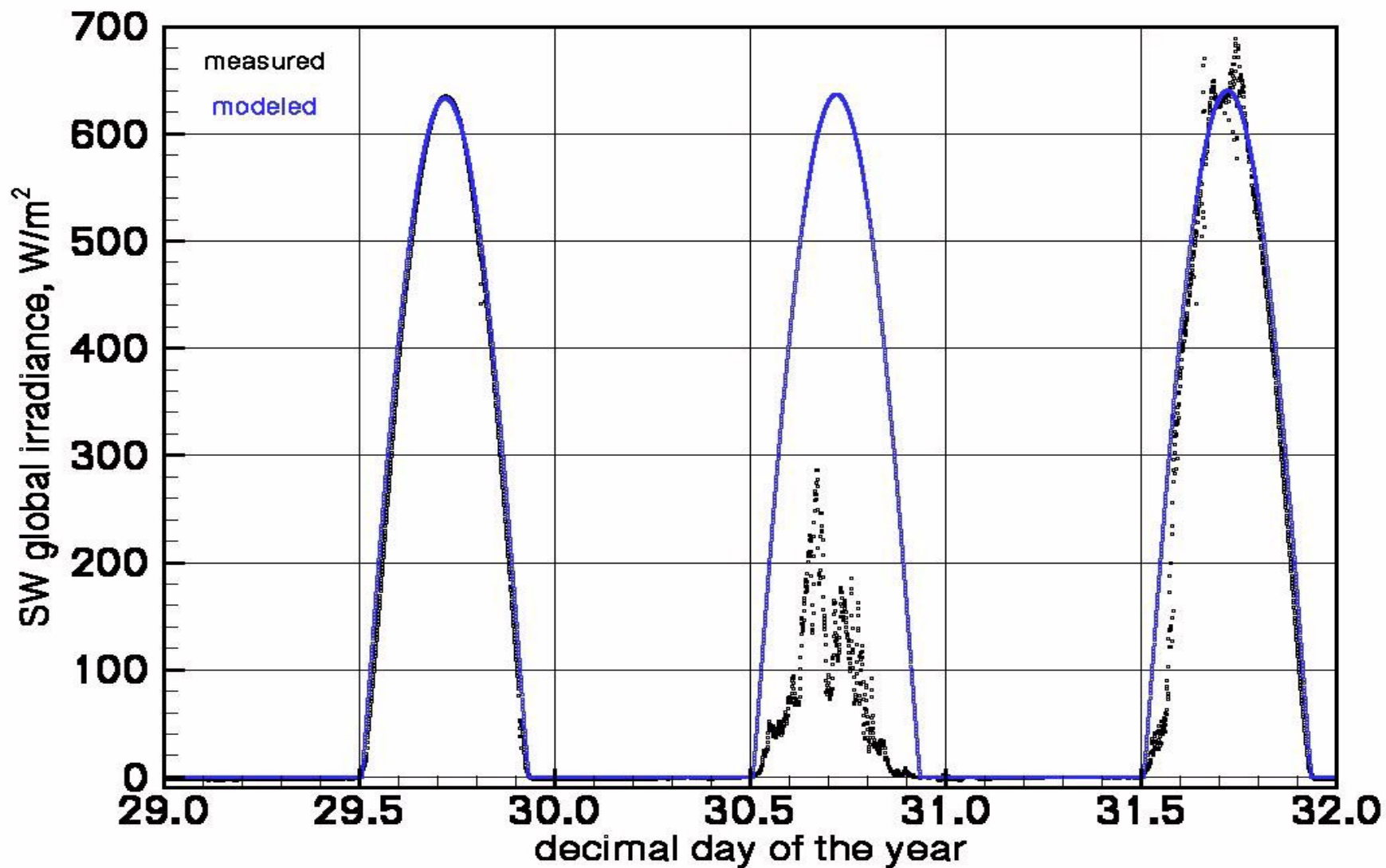
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Measured and modeled SW flux for clear, overcast and partly cloudy days



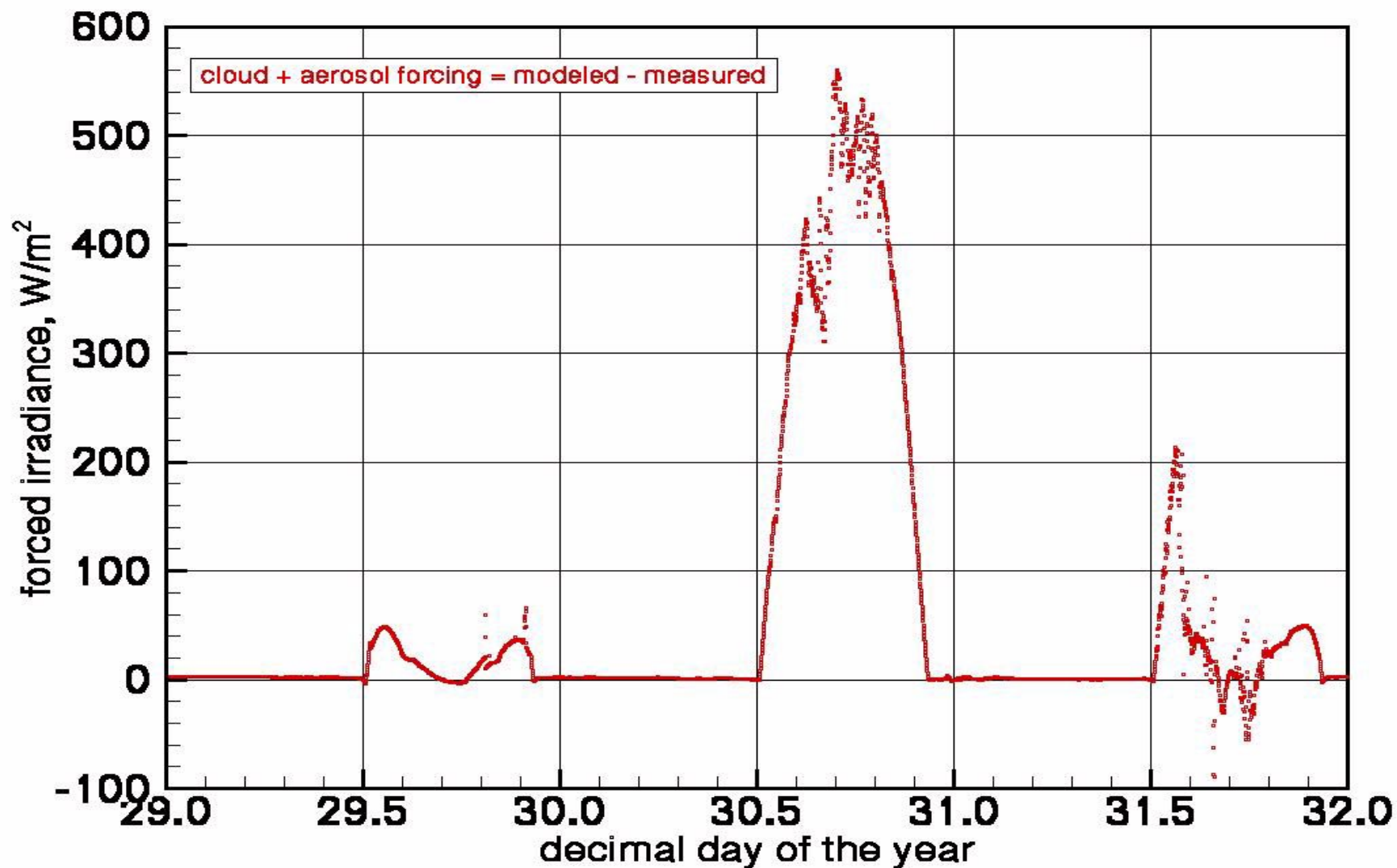
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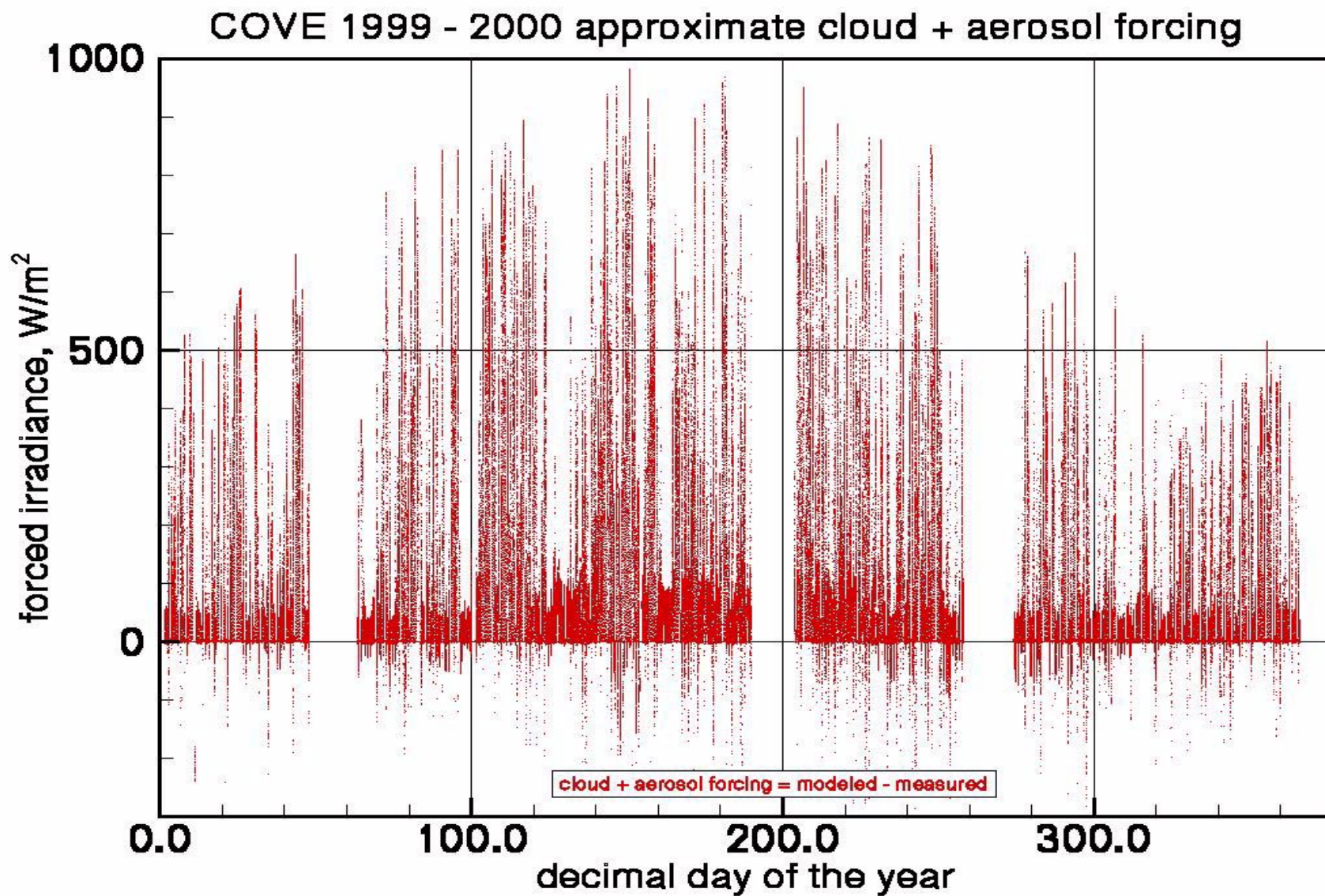
Approximate cloud + aerosol forcing for clear, overcast and partly cloudy days



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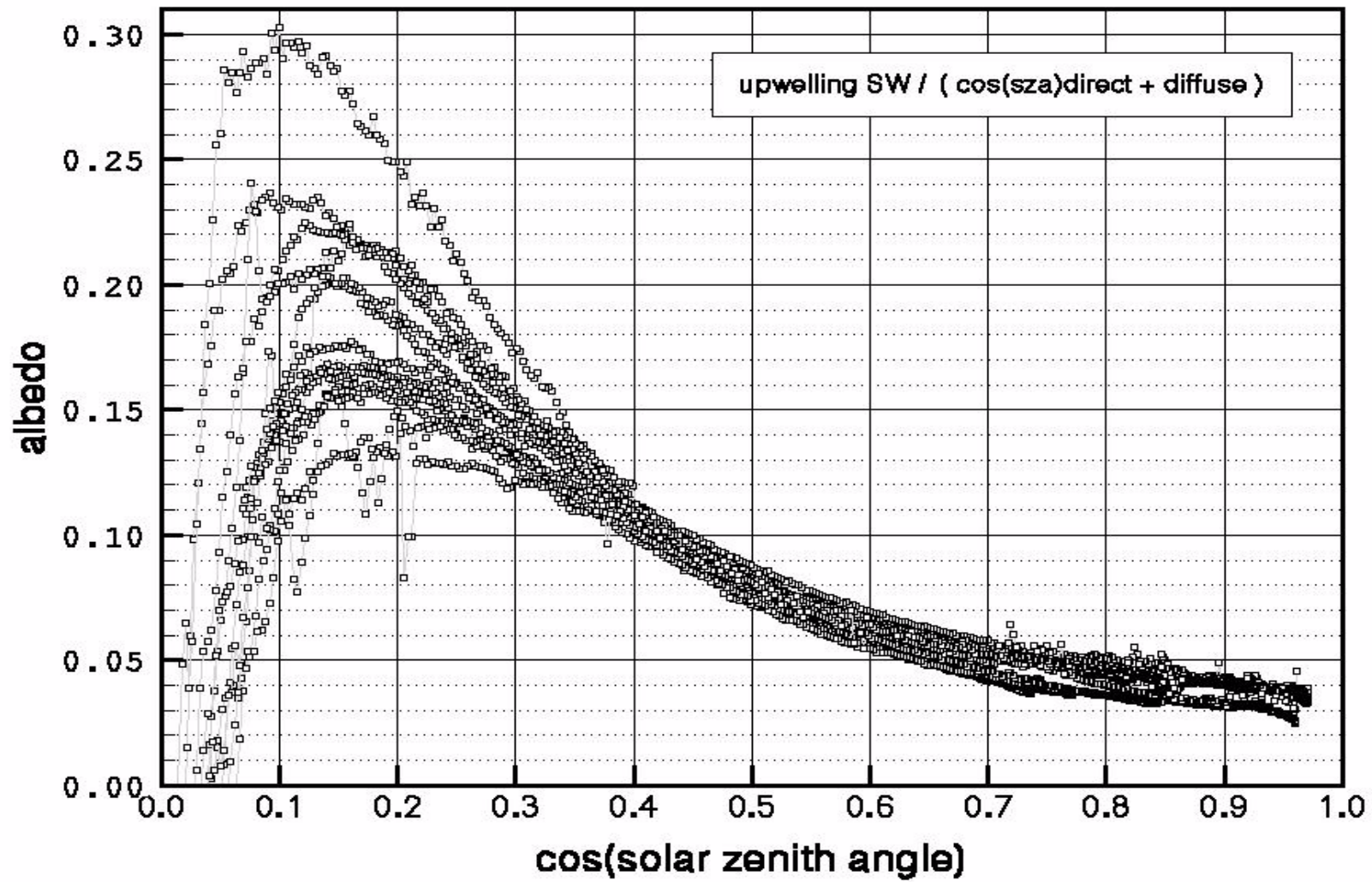
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COVE Clear Sky Ocean Albedo



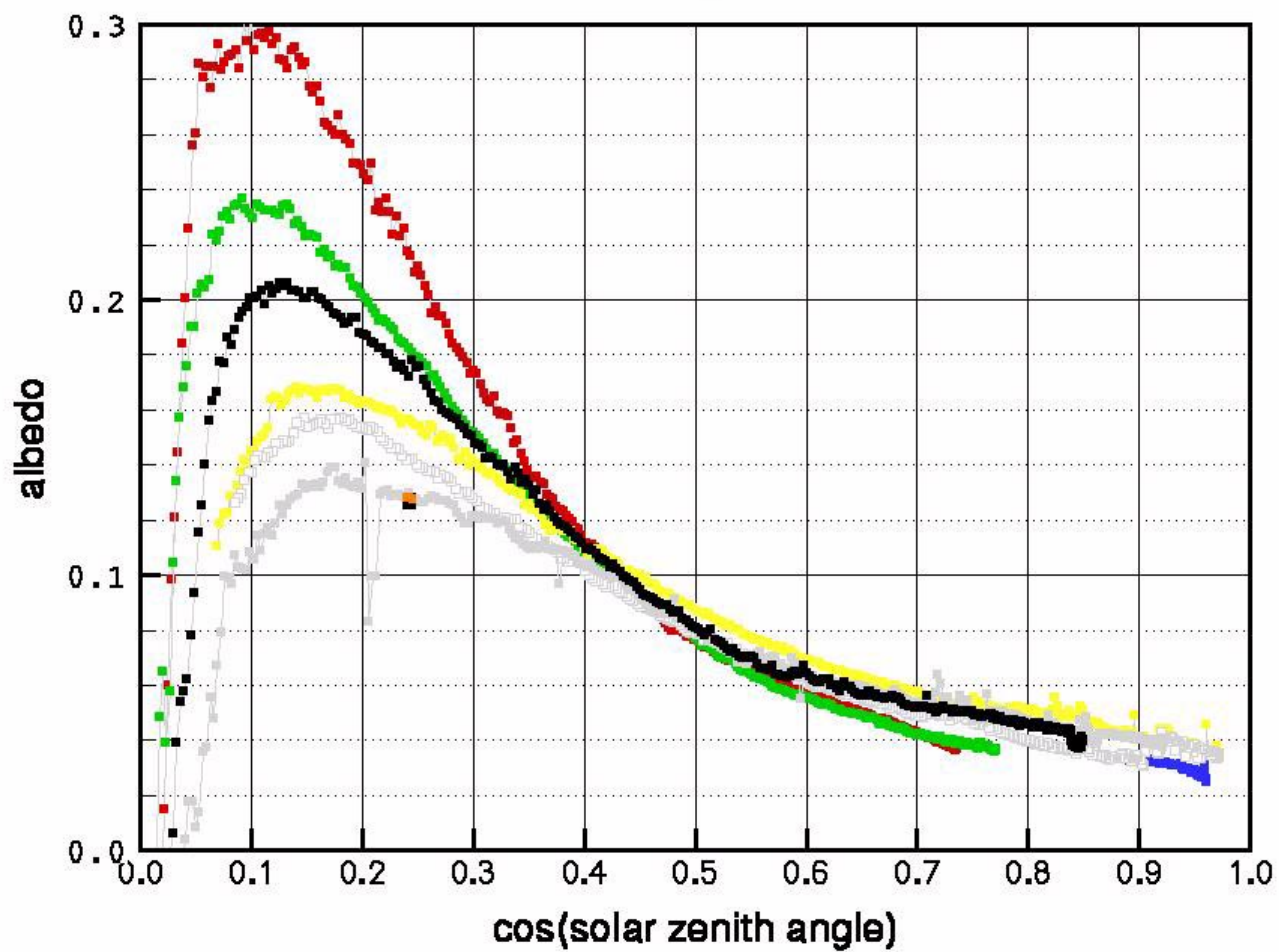
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COVE Clear Sky Ocean Albedo



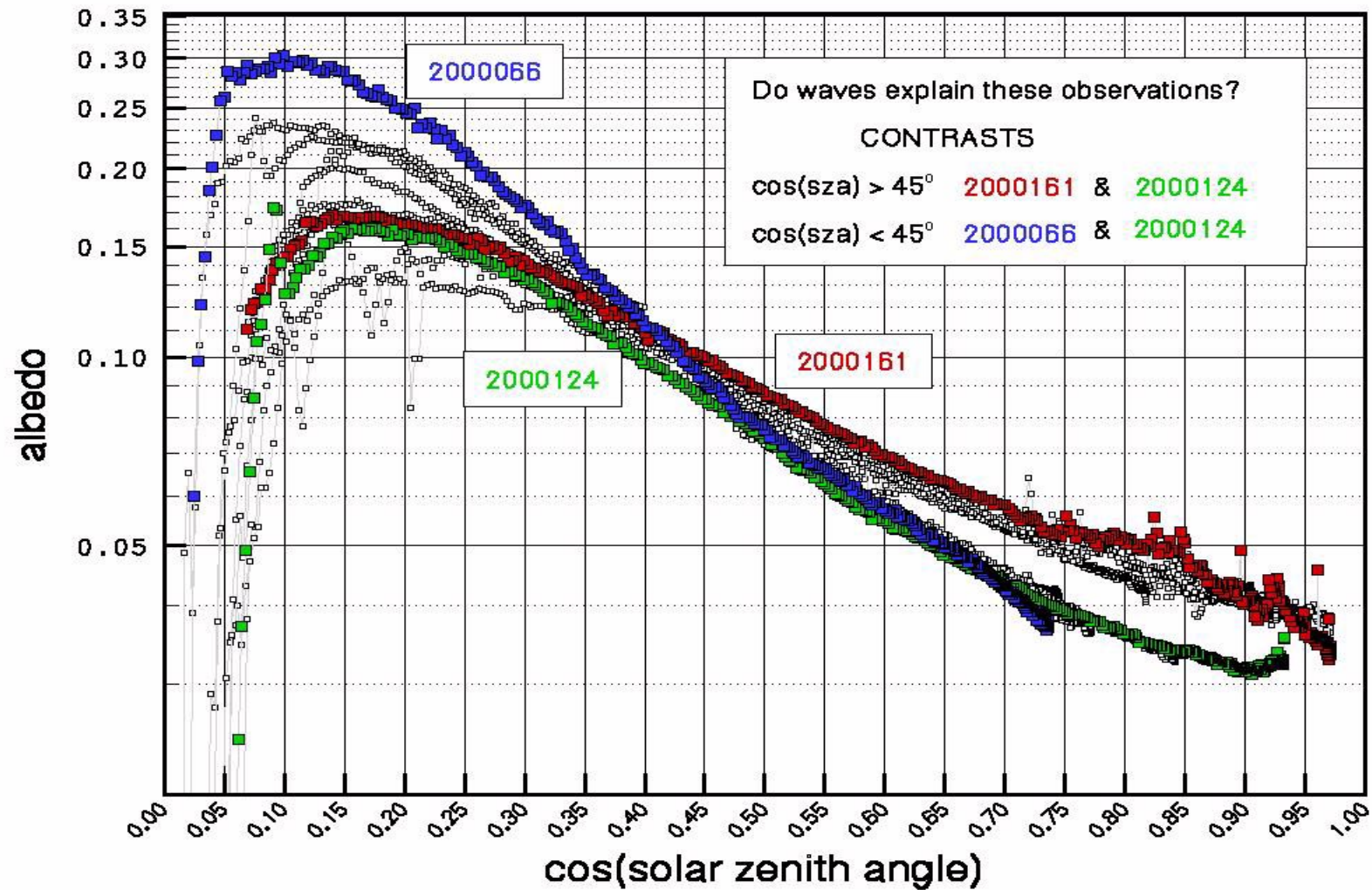
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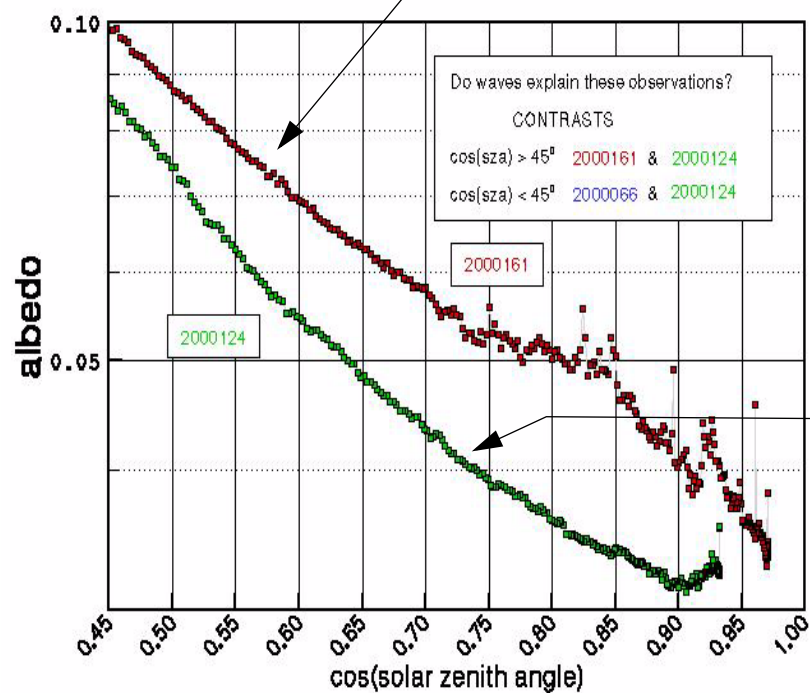
COVE Clear Sky Ocean Albedo



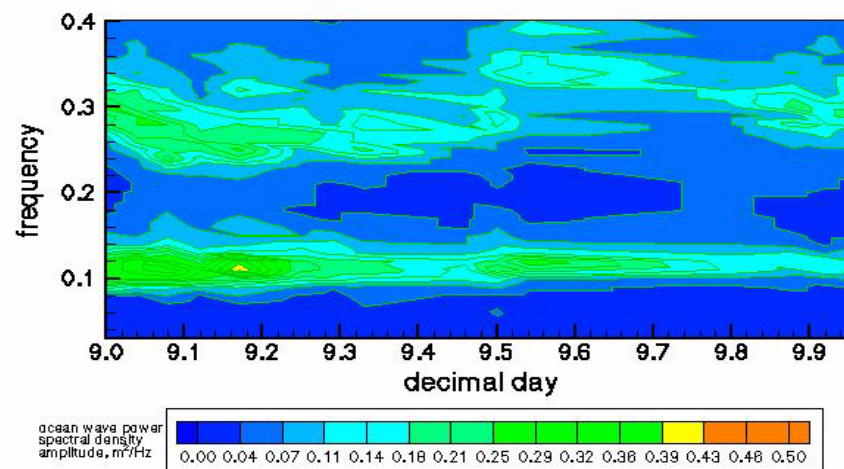
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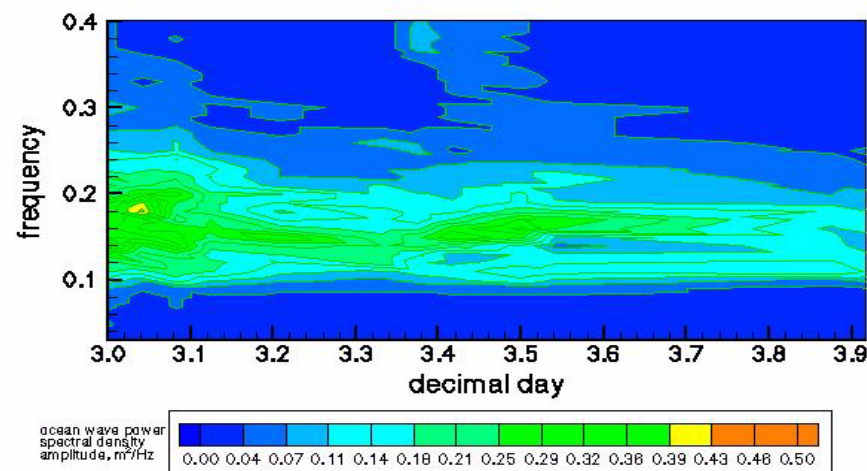
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2000161 COVE ocean surfacewave spectrum amplitude



2000124 COVE ocean surfacewave spectrum amplitude



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